

Form PTO-1449		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTY. DOCKET NO. 30-5000-(4015) Div. 2		PRIORITY SERIAL NO. 09/449,025	
LIST OF ART CITED BY APPLICANT (Use several sheets if necessary)				APPLICANT Shozo Nagano et al. <span style="float: right; font-size: 1.5em;">#13</span>			
				PRIORITY FILING DATE November 24, 1999		PRIORITY GROUP 1775	
U.S. PATENT DOCUMENTS							
*Examiner Initial	Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate	
E	AA	5,972,192	10/1999	Dubin et al.	1	1	<div style="writing-mode: vertical-rl; transform: rotate(180deg);">           1-868 U.S. PTO            09/18/2003            107/449,025         </div>
E	AB	5,719,447	02/1998	Gardner	1	1	
	AC						
	AD						
	AE						
FOREIGN PATENT DOCUMENTS							
	Document Number	Date	Country	Class	Subclass	Translation	
						Yes	No
	AF						
OTHER REFERENCES (including Author, Title, Date, Pertinent Pages, Etc.)							
E	AG		Electromigration Properties of Copper-Zirconium alloy Interconnects, Y. Igarashi et al., <i>J. Vac. Sci. Technol. B</i> 16(5), Sept/Oct. 1998, p. 2745-2750.				
E	AH		Directional and Preferential Sputtering-Based Physical Vapor Deposition, S.M. Rossnagel, 1995 Elsevier Science S.A. p. 1-12.				
E	AI		Excellent Electro/Stress-Migration-Resistance Surface-Silicide Passivated Giant-Grain Cu-Mg alloy Interconnect Technology for Giga Scale Integration (GSI), T. Takewaki et al., 1995 IEEE, p. 95-253-95-256.				
E	AJ		Materials Issues in Copper Interconnections, J.M.E. Harper, et al., <i>MRS Bulletin/August 1994</i> , p. 23-29.				
E	AK		Preparation of Low Resistivity Cu-1 at. %Cr Thin Films by Magnetron, C. Cabral, Jr., et al., <i>Journal of the Institute of Metals</i> , June 1951, p. 185-208.				
E	AL		International Critical Tables of Numerical Data, Physics, Chemistry and Technology, National Research Council of the United States of America, Volumes I-VII, 1933, 6 pages.				
EXAMINER <span style="font-size: 1.5em;">S. Jg</span>				DATE CONSIDERED <span style="font-size: 1.5em;">7/1/02</span>			
<p>*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.</p>							

Form PTO-1449

U.S. DEPARTMENT OF COMMERCE  
PATENT AND TRADEMARK OFFICEATTY. DOCKET NO.  
30-5000-(4015)-Div2SERIAL NO.  
09/784,233LIST OF ART CITED BY APPLICANT  
(Use several sheets if necessary)APPLICANT  
Shozo Nagano et al.FILING DATE  
February 14, 2001GROUP  
Unknown 1742

## U.S. PATENT DOCUMENTS

*Examiner Initial		Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate
2	AA	6,113,781	09/05/00	Kardokus et al.	204	298.13	
2	AB	6,093,966	07/25/00	Venkatraman et al.	257	751	
	AC						
	AD						
	AE						
	AF						
	AG						
	AH						
	AI						
	AJ						
	AK						

## FOREIGN PATENT DOCUMENTS

		Document Number	Date	Country	Class	Subclass	Translation	
							Yes	No
2	AL	01096376 A	14.04.89	Japan (ABSTRACT)	1	1		
2	AM	10287939	27.10.98	Japan (ABSTRACT)	1	1		
	AN							
	AO							
	AP							

## OTHER REFERENCES (including Author, Title, Date, Pertinent Pages, Etc.)

2	AR		Phillips et al., <i>The Effect of Certain Solute Elements on the Recrystallization of Copper</i> , 81 JOURNAL OF THE
			INSTITUTE OF METALS 185-208 (1953).
2	AS		ABSTRACT: Pierson et al., <i>Total sputtering yield of Ag/Cu alloys for low energy argon ions</i> , § 8 NUCL. INSTRUM.
			METHODS PHYS. RES. 108(3), pp. 290-9 (1996).
	AT		

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LIST OF ART CITED BY APPLICANT (Use several sheets if necessary)		APPLICANT Shozo Nagano et al.		#5	
FILING DATE February 14, 2001		GROUP Unknown 1742			

U.S. PATENT DOCUMENTS							
*Examiner Initial		Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate
A	AA	3,666,666	05/30/72	Haertling	252	62.9	
I	AB	3,923,675	12/02/75	Mazdiyasni et al.	252	62.9	
I	AC	5,066,617	11/19/91	Tanemoto et al.	501	134	
C	AD	5,314,651	05/24/94	Kuhwicki	264	65	
	AE						
	AF						
	AG						
	AH						
	AI						
	AJ						
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FOREIGN PATENT DOCUMENTS								
		Document Number	Date	Country	Class	Subclass	Translation	
							Yes	No
E	AL	06081138 J	03.01.94	<del>Watanabe et al.</del> JP			Abstract	
E	AM	09249957 A	22.09.87	<del>Watanabe et al.</del> JP			Abstract	
	AN							
	AO							
	AP							

OTHER REFERENCES (including Author, Title, Date, Pertinent Pages, Etc.)			
A	AR		Foster, Composition and Structure of Sputtered Films of Ferroelectric Niobates, 8 THE JOURNAL OF VACUUM SCIENCE AND TECHNOLOGY, No. 1,
			pp. 251-255 (1971).
A	AS		Haertling, Hot-Pressed Ferroelectric Lead Zirconate Titanate Ceramics for Electro-Optical Applications, 49 CERAMIC BULLETIN, No. 6,
			pp. 584-587 (1970).
	AT		

EXAMINER S. Ip	DATE CONSIDERED 7/1/02
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Shozo Nagano et al.FILING DATE  
February 14, 2001GROUP  
Unknown 1742

## U.S. PATENT DOCUMENTS

Examiner Initial		Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate
AA		3,963,934	08/15/76	Ormod	250	499	
AB		4,132,614	01/02/79	Cuomo et al.	204	192 EC	
AC		4,149,907	04/17/79	Wronski et al.	148	1.5	
AD		4,159,909	07/03/79	Wilson	75	170	
AE		4,198,283	04/15/80	Class et al.	204	298	
AF		4,209,375	06/24/80	Gates et al.	204	192 R	
AG		4,395,979	05/31/83	Pierce et al.	204	298	
AH		4,545,882	10/08/85	McKelvey	204	192 R	
AI		4,629,859	12/16/96	Reddy	219	121 LM	
AJ		4,814,053	03/21/89	Shimokawato	204	192.15	
AK		5,171,411	12/15/92	Hillendahl et al.	204	192.12	

## FOREIGN PATENT DOCUMENTS

		Document Number	Date	Country	Class	Subclass	Translation	
							Yes	No
AL		EP 0 882 813 A1	09.12.98	Europe (Takahashi)				
AM		61084389 A2	28.04.86	Japan (Takewaki) - Abstract only				
AN		61113740 A2	31.05.86	Japan (Tanaka) - Abstract only				
AO		62127438	09.06.87	Japan (Tatsuta) - Abstract only				
AP		63033174	12.02.88	Japan (Kazuka) - Abstract only				

## OTHER REFERENCES (including Author, Title, Date, Pertinent Pages, Etc.)

AR		Dierckxens et al., <i>Effect of trace elements on the recrystallization behavior of high purity oxygen-containing copper</i> , ERZMETAL 28(11), 498-500 (1975). Abstract only.
AS		Lucke et al., <i>Physical Metallurgy Principles</i> , 5 ACTA MET. 298 (1957).
AT		Pierson et al., <i>Total sputtering yield of Ag/Cu alloys for low energy argon ions</i> , NUCL. INSTR. AND METH. IN PHYS. RES. 108 B, pp. 290-299 (1996). Full text of article submitted in abstract earlier.

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Form <b>PTO 1449</b> <div style="border: 2px solid black; border-radius: 50%; padding: 10px; display: inline-block; text-align: center;"> <b>OTPE</b>  <b>MAY 14 2001</b>  <b>PATENT &amp; TRADEMARK OFFICE</b> </div>		<b>U.S. DEPARTMENT OF COMMERCE</b> <b>PATENT AND TRADEMARK OFFICE</b>		ATTY. DOCKET NO. 30-5000-(4015)-Div2		SERIAL NO. 09/784,233	
<b>LIST OF ART CITED BY APPLICANT</b> (Use several sheets if necessary)				APPLICANT Shozo Nagano et al.		FILING DATE February 14, 2001	
				GROUP Unknown <b>174</b>			

U.S. PATENT DOCUMENTS							
*Examiner Initial		Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate
P	AA	5,215,639	06/01/93	Boys	204	192.12	
	AB	5,242,566	09/07/93	Parker	204	298.2	
	AC	5,268,236	12/07/93	Dumont et al.	428	636	
	AD	5,282,943	02/01/94	Lannutti et al.	204	192.12	
	AE	5,282,946	02/01/94	Kinoshita et al.	204	298.13	
	AF	5,336,386	08/09/94	Marx et al.	204	298.12	
	AG	5,397,050	03/14/95	Mueller	228	193	
	AH	5,490,914	02/13/96	Hurwitt et al.	204	289.12	
	AI	5,589,040	12/31/96	Nishimura	204	192.26	
	AJ	5,674,367	10/07/97	Hunt et al.	204	298.12	
P	AK	5,693,203	12/02/97	Ohhashi et al.	240	298.12	

FOREIGN PATENT DOCUMENTS								
		Document Number	Date	Country	Class	Subclass	Translation	
							Yes	No
P	AL	63064211	22.03.88	Japan (Furukawa) - Abstract only				
	AM	63118033	23.05.88	Japan (Sumitomo Metal mining Co.) - Abstract only				
	AN	63235442 A2	30.09.88	Japan (Furukawa) - Abstract only				
	AO	1-96374	14.04.89	Japan				X
	AP	1-96376	14.04.89	Japan (Ishikura)			X	


OTHER REFERENCES (including Author, Title, Date, Pertinent Pages, Etc.)			
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 <b>LIST OF ART CITED BY APPLICANT</b> (Use several sheets if necessary)				APPLICANT Shozo Nagano et al.			
				FILING DATE February 14, 2001		GROUP Unknown <b>(74)</b>	
U.S. PATENT DOCUMENTS							
Examiner Initial	Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate	
9	AA	5,772,858	06/30/98	Tepman	204	192.12	
	AB	5,833,823	11/10/98	Gruenenfelder et al.	204	298.09	
	AC	5,846,389	12/08/98	Levine et al.	204	192.1	
	AD	6,010,583	01/04/00	Annavarapu et al.	148	513	
	AE	6,028,003	02/22/00	Frisa et al.	438	653	
	AF	6,039,855	03/21/00	Wollenberg	204	298.12	
	AG	6,042,752	03/28/00	Mitsui	252	520.1	
	AH	6,068,742	05/30/00	Daxinger et al.	204	298.09	
	AI	6,086,735	07/11/00	Gilman et al.	204	298.12	
	AJ	6,117,281	09/12/00	Novbakhlian	204	192.16	
	AK	6,121,685	09/19/00	Gardner	257	762	
	AL	6,139,701	10/31/00	Pavate et al.	204	192.17	
FOREIGN PATENT DOCUMENTS							
	Document Number	Date	Country	Class	Subclass	Translation	
						Yes	No
9	AM	02301585	13.12.90	Japan (Furukawa) - Abstract only			
	AN	05078195 A2	30.03.93	Japan (Sugiura) - Abstract only			
	AO	10-287939	27.10.98	Japan (Eguchi)			X
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OTHER REFERENCES (including Author, Title, Date, Pertinent Pages, Etc.)							
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EXAMINER <b>S.I.P</b>				DATE CONSIDERED <b>2/1/02</b>			
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Form PTO-1449 <div style="border: 1px solid black; border-radius: 50%; padding: 10px; display: inline-block; transform: rotate(-45deg); transform-origin: center;">           OFFICE            MAY 14 2001            PATENT &amp; TRADEMARK OFFICE         </div>		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTY. DOCKET NO. 30-5000-(4015)-Div2		SERIAL NO. 09/784,233	
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FILING DATE February 14, 2001				GROUP Unknown 1742			

U.S. PATENT DOCUMENTS							
*Examiner Initial	Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate	
	AA	09/558,488	Kardokus et al. (as filed)	1	1	04/21/2000	
	AB	09/815,474	Kardokus et al. (as filed and as amended)	1	1	07/13/2000	
	AC	09/714,714	Kardokus (as filed)	1	1	11/15/2000	
	AD						
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FOREIGN PATENT DOCUMENTS							
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09/784,233LIST OF ART CITED BY APPLICANT  
(Use several sheets if necessary)APPLICANT  
Shozo Nagano et. al.

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FILING DATE  
February 14, 2001GROUP  
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## U.S. PATENT DOCUMENTS

*Examiner Initial		Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate
	AA						
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## FOREIGN PATENT DOCUMENTS

		Document Number	Date	Country	Class	Subclass	Translation	
							Yes	No
	AM							
	AN							
	AO							
	AP							
	AQ							

## OTHER REFERENCES (including Author, Title, Date, Pertinent Pages, Etc.)

B	AR		Brizzolara et. al., Low Energy Sputtering of Eutectic Ag/Cu Alloys, B26 NUCLEAR INSTRUMENTS AND METHODS IN PHYSICS
			RESEARCH 528-531 (1987).
	AS		
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Form PTO-4449		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE			ATTY. DOCKET NO. 30-5000-(4015)-Div2		SERIAL NO. 09/784,233	
LIST OF ART CITED BY APPLICANT (Use several sheets if necessary)					APPLICANT Shozo Nagano et al.			
					FILING DATE February 14, 2001		GROUP 1742	

U.S. PATENT DOCUMENTS							
*Examiner Initial	Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate	
J	AA	5,023,698	08/11/91	Kobayashi et al.	357	67	
	AB	5,833,820	11/10/98	Dubin	204	212	
	AC	5,895,562	04/20/99	Dubin	205	137	
J	AD	6,162,726	12/19/00	Dubin	438	678	
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FOREIGN PATENT DOCUMENTS							
	Document Number	Date	Country	Class	Subclass	Translation	
						Yes	No
J	AL	0 335 383 A2	30.03.89	Europe (Kobayaashi et al.)	1	1	
	AM	0 626 722 A1	09.02.93	Europe (Ohmi)			
	AN	WO 00/73531 A2	07.12.00	WIPO (Kardokus et al.)			
	AO						
	AP						

OTHER REFERENCES (including Author, Title, Date, Pertinent Pages, Etc.)		
J	AR	Massalski, 18 BINARY ALLOY PHASE DIAGRAMS 18-19, 928-929, 936-937, 964-965 (1986).
	AS	
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Form PTO-1449		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTY. DOCKET NO. 30-5000-(4015)-Div2	SERIAL NO. 09/784,233	
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U.S. PATENT DOCUMENTS				GROUP 1742		
*Examiner Initial	Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate
3	AA 4,876,827	6-30-87	Hosoda et al.			
1	AB 4,986,856	1-22-94	Tanigawa et al.			
	AC 5,077,005	12-31-91	Kato			
	AD 6,117,781	9-12-00	Lukanc et al.			
	AE 6,117,782	9-12-00	Lukanc et al.			
	AF 6,121,150	9-19-00	Avanzino et al.			
12	AG 6,197,433	3-6-01	Hatano			
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